REMARKS

Status of the Claims

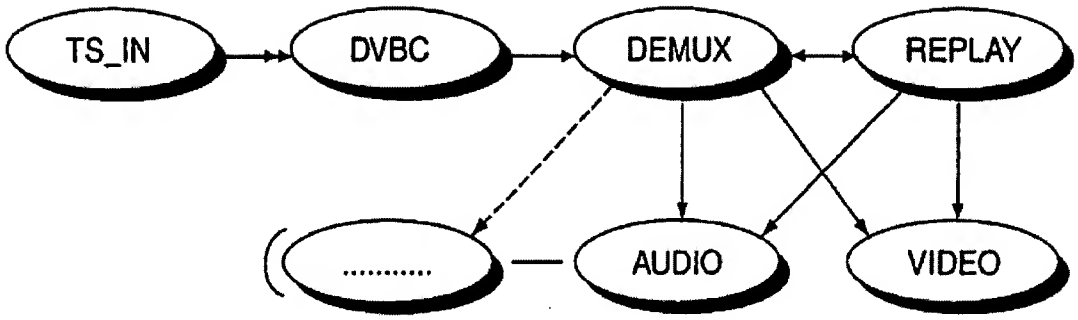
Claims 1-34 stand finally rejected as allegedly being anticipated by or obvious in view of the U.S. Patent No. 6,775,463 ("Nooralahiyan") and claims 35-38 stand withdrawn as allegedly drawn to an invention independent or distinct from the invention originally claimed.

The Applicants hereby amend independent claims 1 and 25. The amendments should be entered after final rejection because they raise no new issues, as they merely clarify what was has been claimed. Moreover, the amendments clearly place the claims in condition for allowance for the reasons explained below, or at least better frame the issues for appeal.

The Applicants respectfully submit that the rejections of claims 1-34 should be withdrawn and that those claims are allowable for at least the reasons discussed below. Furthermore, the Applicants respectfully traverse the withdrawal of claims 35-38 and request that they be examined and allowed.

The Nooralahiyan Reference

As pointed out in the Applicant's last Response, Nooralahiyan discloses a video receiver and display method reminiscent of the currently popular "TiVo" system. That is, Nooralahiyan enables selected replay of broadcast audio and video content, at normal or slow motion speeds, on demand. This is accomplished by implementing physical memory buffers to store data packets. The data stored in the buffers has already been decoded into usable video content. To illustrate, below is a reproduction of Nooralahiyan's Figure 1.



This figures represents various processes performed by Nooralahiyan's set top box receiver and their interactions. Nooralahiyan describes this figure at column 1, lines 47-66, as follows:

> The TS-IN process compares the Packet ID (PID) of the incoming Transport Packet with the PID Action Table held in the memory of the receiver to distinguish between packets that should be routed to the memory and the packets of data which can be rejected. The TS-IN process initially searches for PID 0 which contains the Program Association Table (PAT). The DVBC process determines whether or not the data packet needs unscrambling and, if so, and a valid key exists, the packets are decrypted and repacked before being passed on to the DEMUX process. The DEMUX process establishes the type of payload by examining and extracting the relevant information from the PID table and routing it to the relevant process. For example, if the information is video, it is routed to the VIDEO process and so on. VIDEO, AUDIO and other consumer processes provide simple interfaces to the device drivers. The REPLAY process interacts with the DEMUX/Routing process and the Video process. The VIDEO process typically can not receive video packets from DEMUX and REPLAY processes simultaneously.

It is clear from this description that every process depicted in Nooralahiyan's Figure 1 occurs after the signal has been fully received, demodulated, undergone all forward error correction ("FEC") decoding, and is otherwise a clean, clear signal. This is so because the TS-IN process must be able to read the packet IDs of incoming packets. As the Examiner is surely aware, the DVB standard calls for a physical transport layer

that utilizes specific modulation and error correction, including an inner punctured convolutional code and an outer Reed-Solomon code. In fact, this is described in the Applicant's specification at pages 1-5 and clearly illustrated in the Haas IEEE article (see especially Figure 3 on page 342; see also Tawil's Figure 1). Unless and until the signal has been demodulated and FEC decoding performed, the bit stream is a jumbled mess from which no packet structure can be recognized. Only after FEC decoding can the packet IDs be discerned by Nooralahiyan's TS-IN process. Thus, Nooralahiyan's Figure 1 – and, in fact, all of Nooralahiyan's discussion – presupposes that FEC decoding has already taken place.

As if that were not clear enough, consider the other processes in Nooralahiyan's Figure 1. The DVBC process determines whether descrambling is necessary and does so if needed. Clearly, descrambling (i.e., a rearrangement of the bits in a bit stream) does not make sense unless FEC decoding has already taken place. Keep in mind that FEC coding adds redundancy to the data (FEC decoding removes that redundancy); descrambling a different number of bits before decoding (they are called "symbols" and they differ from decoded bits in their length) is nonsensical. Likewise, Nooralahiyan's DEMUX process assumes that its input is FEC decoded and otherwise "clean."

With that understanding in mind, it is clear that Nooralahiyan's DEMUX and REPLAY processes simply selectively buffer and play the audio/video signal. By "play" or "replay," Nooralahiyan means display the images and voice the sounds through the respective VIDEO and AUDIO device driver processes depicted in Figure 1.

While Nooralahiyan refers to "decoding" operations, it is clear that such decoding must be source decoding in the form of MPEG or MPEG-2 decoding. That is so because all of Nooralahiyan's references to "decoding" are in the context of playing or replaying the audio/video signal*, and that is where all such source decoding occurs.

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* See, for example, column 2, lines 47-49 ("decoding the received data into a form for the generation of a video display on a display screen connected to the data receiver . . .").

Moreover, Nooralahiyan's discussion of the decoding of I, P, and B frames from column 4, line 52 through column 5, line 3 is specific to MPEG. As the Examiner surely knows, source coding (also known as data compression) is meant to eliminate redundancy from data so that it can be transmitted across a lower bandwidth channel, whereas channel coding (e.g., FEC coding) is meant to selectively add controlled redundancy to data so that it can be more reliably received on the other end of the channel. Clearly, to obtain the benefit of source coding, it should occur near the source, implying that the corresponding decoding (i.e., decompression) should occur at or near the ultimate sink for the data. In this case, the ultimate sink is the video image display and the audio sound system. It would be foolish and inefficient to perform scrambling/descrambling, muxing/demuxing, packetizing/unpacketizing, etc. on uncompressed or decompressed data.

Thus, the Applicants respectfully disagree with the Office's assertion that "Nooralahiyan discloses multiple decoders in his system: DVBC, audio, and video decoders." (Second Office Action, page 2, ¶ 3) The only decoders referred to by Nooralahiyan are MPEG-type source decoders (i.e., MPEG decompression units).

Claims 1-10

Claim 1 and several of its dependent claims stand rejected as allegedly being anticipated by Nooralahiyan under 35 U.S.C. § 102(e), while other claims depending from claim 1 stand rejected as allegedly being obvious over Nooralahiyan in view of either Haas (IEEE article) or U.S. Patent No. 6,690,926 ("Tawil").

Claim 1, as amended, reads as follows:

> 1. A method for sharing a decoder among a plurality of data streams comprising:
> decoding data samples from a first data stream in said plurality of data streams;
> storing N data samples processed from said first data stream in a decoder re-processing buffer before decoding data from other data streams in said plurality; and

> decoding again said N data samples stored in said decoder re-processing buffer to restore said decoder to a state said decoder was in when it last decoded said data samples from said first data stream prior to processing any new data samples from said first data stream.

These amendments are not believed to change the scope of the claim, yet they make it clear that the claim is not anticipated by Nooralahiyan by clarifying limitations that the Office has overlooked or failed to fully appreciate. As such, these amendments clearly are supported by the specification as originally filed.

The rejection of claim 1 should be withdrawn for at least two reasons. First, Nooralahiyan does not suggest or disclose "a plurality of data streams," "sharing a decoder among a plurality of data streams," "a first data stream," and "other data streams." Rather, Nooralahiyan only refers to processing of a single data stream. The Applicants raised a related point in the last response, and the Office responded as follows:

> With regard to sharing, Nooralahiyan also discloses that his device is used in broadcast video applications (see abstract), which are understood to consist of multiple data streams, and would require Nooralahiyan's device to be shared among multiple data streams to provide functionality of decoding broadcast video and therefore appropriate.

(Second Office Action, page 2, ¶ 3). While it may be true that Nooralahiyan's MPEG decoders – in fact his entire system – is "shared" in this sense, Nooralahiyan's system is operable to decode, play, or replay only one single data stream over any time period relevant to Nooralahiyan's invention. Nooralahiyan decodes, plays, or replays one data stream – corresponding to the channel to which his set top box is tuned. However, the body of claim 1 refers to particular details of interactions among "a first data stream" and "other data streams." Nooralahiyan does not disclose or suggest such interactions. In fact, the rejection of claim 1 (restated on page 3, ¶ 4) fails to even acknowledge the recited interactions among "a first data stream" and "other data streams." Instead, the rejection seems to refer to Nooralahiyan's "replay functionality" as "interpreted as equivalent." The Applicants strongly disagree with that conclusory assertion.

Nooralahiyan's replay functionality concerns displaying again the same data stream; that is what the "re" in "replay" signifies, and that is very clearly what Nooralahiyan's system concerns. In fact, Nooralahiyan's TS-IN process makes that clear. That process, as explained in column 3, lines 47-51, filters out any packets that do not correspond to the one and only data stream that Nooralahiyan processes over any time period relevant to Nooralahiyan's invention. The Office's suggestion that this passage somehow means something different so as to support the rejection is unfounded. The Applicants accordingly submit that claim 1 is allowable over Nooralahiyan on this basis.

Second, Nooralahiyan does not disclose or suggest "decoding input data samples from a first data stream" and "decoding again said N data samples." To the contrary, Nooralahiyan decodes once the data he receives. That decoded data is stored in the portion of his circular buffer signified by the dashed line 2 in Figure 2. While Nooralahiyan replays (i.e., displays again) that decoded data, Nooralahiyan does not decode that data again. Nooralahiyan's system is a decode-once, display-many-times system. Perhaps the Office misinterpreted "replay" as used in claim 1 before the present amendment to mean the same thing as "replay" in the context of Nooralahiyan (i.e., to display previously decoded data again). That was incorrect. To clarify, the Applicant has amended claim 1 to refer to "decoding again" or "decoder re-processing" rather than "replay." In light of this distinction, the Applicants respectfully submit that claim 1 is allowable over Nooralahiyan.

Claims 2 and 3 are allowable for another reason. Both claims refer to "accumulator values." The rejection of claims 2 and 3 refers to "values" but essentially ignores the word "accumulator." The Office has failed to set forth a basis for its apparent interpretation of the word "accumulator" such that it has no weight. The Office furthermore has failed to even attempt to show how Nooralahiyan teaches or discloses "accumulator values." There is absolutely no basis for the Office's bald assertion that Nooralahiyan's "history loop is interpreted as containing N accumulator values." (page 4, lines 4-5) The Applicants therefore demand that the Office either properly support the rejection as it concerns "accumulator values" or withdraw the rejection.

Claims 4-8 are allowable for another reason. Claims 4-7 refer to a "forward-error correction (FEC) decoder," "maximum likelihood decoder," "convolutional decoder," and "Viterbi decoder," respectively. As explained above, the only decoder disclosed by Nooralahiyan is an MPEG-type source decoder (that is, a data decompression module). The Office acknowledges this deficiency in Nooralahiyan and turns to Haas for its teaching of a decoder of the recited types. However, as explained above, any combination of Haas and Nooralahiyan would be as follows:

Haas Fig. 2 → Haas Fig. 3 → Nooralahiyan Fig. 1

Those figures concern a QPSK Demodulator, a QPSK "Processor" and a Depacketizer / Descrambler / Demultiplexer / MPEG Decoder, respectively. Haas and Nooralahiyan thus concern different parts of a receiver. Any FEC, convolutional, maximum likelihood or Viterbi decoding, as taught by Haas, occur "upstream" from the MPEG decoding of Nooralahiyan. As such, Haas's teachings are simply inapplicable to the MPEG decoder operations disclosed by Nooralahiyan, and nobody of ordinary skill would attempt to combine the two references in the way the Office has proposed. Put simply, the rejection attempts to mix apples and oranges.

In summary, claims 1-10 are allowable over the references of record, and the rejection of those claims should be withdrawn.

Claims 11-16

Claim 11 reads as follows:

> 11. A replay method of context switching a decoder comprising:
> decoding a first set of data from a first data stream to generate a first plurality of decoded data, said decoder being in a first state after decoding said first set of data;
> temporarily storing said first set of data in a buffer;
> decoding other sets of data from one or more other streams;

restoring said decoder to said first state by re-decoding said first set of data from said buffer; and

decoding a second set of data from said first data stream after said decoder is restored to said first state, said decoder being in a second state after decoding said second set of data.

Claim 11 clearly refers to "a first data stream" and "one or more other streams." The claim also refers to "re-decoding said first set of data." The Applicants therefore respectfully submit that claim 11 is allowable over Nooralahiyan for the same or similar reasons as discussed above in relation to claim 1.

Furthermore, claim 13 refers to "accumulator values" and its rejection is deficient for the same or similar reasons as discussed above in relation to claims 2-3. Also, claims 14-15 recite limitations like those in claims 4 and 7 and are therefore allowable for similar reasons.

Claims 17-24

Independent claim 17 refers to a "data replay means for restoring said decoder to a state it was in . . . ." This language falls under 35 U.S.C. § 112, ¶ 6 as "means plus function" language. As such, it is to be interpreted in light of the specification as covering those structures disclosed in the specification and equivalents thereof. The Office however has failed to interpret this claim under section 112, paragraph 6. This error is facially apparent from the words of the rejection itself: "With regard to claims 17-19, the components claimed as apparatus is nothing more than a restatement of the embodiments of the steps claimed as method and therefore it would have been obvious, considering the aforementioned rejection for the method claims of 1-3." (Second Office Action, page 4) However, even a cursory inspection of the specification shows that the structure corresponding to the recited function is markedly and patentably different from what Nooralahiyan discloses. That is true, even assuming that Nooralahiyan discloses the recited function, which is not the case, as the discussion above with relation to the earlier claims shows.

Moreover, to the extent that the rejection of claims 17-19 is an obviousness rejection (that is not clear because the language quoted above says "obvious" while the preceding page of the office action states the rejections of claims 1-3 and 17-19 as being under § 102(e)), the rejection is clearly improper and incomplete, for no mention is made of a motivation to modify Nooralahiyan or combine Nooralahiyan with any other cited reference.

Accordingly, the Applicants kindly demand that the Office either present a *prima facie* rejection of claim 35-38 – as properly interpreted – or withdraw the rejection.

Claims 25-34

Claim 25, as amended, reads as follows:

> 25. An integrated circuit (IC), said IC comprising:
> a decoder for decoding data symbols from a first data stream among a plurality of input data streams;
> a decoder re-processing buffer for storing N data symbols processed from said first data stream before decoding data from other data streams in said plurality; and
> decoder re-processing logic to re-process said N data symbols stored in said decoder re-processing buffer and thereby restore said decoder to a state said decoder was in when it last decoded said data symbols from said first data stream prior to processing any new data symbols from said first data stream.

For the sake of brevity, the Applicant simply points out that claim 25 and its dependent claims are allowable for reasons that should be self-apparent in view of the foregoing remarks to this point.

The Applicants thank the Examiner for his notice of a lack of antecedent basis in claim 25, which has been rectified by the present amendments.

Claims 35-38

Claims 35-38 were newly added in the last response. The Second Office Action restricted these claims and withdrew them under the doctrine of election by original presentation. The stated grounds for restriction is that the "[o]riginal claims were drawn to a shared decoder method and apparatus" while "[n]ewly added claim 35 is drawn to a replay method for a digital video receiver."

Actually, claim 35 reads as follows:

> 35. A replay method of sharing a decoder among multiple input symbol streams in a digital video receiver comprising:
>
> processing a first series of symbols from a first input stream in the decoder to generate a first plurality of metric data, said decoder being in a first state after processing said first series of symbols;
>
> temporarily storing said first series of symbols in a replay buffer;
>
> processing a second series of symbols from a second input stream in the decoder to generate a second plurality of metric data; and
>
> context switching the decoder to said first state by re-processing said first set of symbols from the replay buffer.

Rather than having to do with "a replay method for a digital video receiver" in the sense of displaying again a video signal, this claim relates to a "decoder," "sharing a decoder among multiple input symbol streams," and "context switching." Although the scope of claim 35 is not coextensive with any of the other claims in the application, it is clearly related to the same subject matter. In fact, the reference to "symbols" and "metric data" has well-understood meaning in light of the specification and common usage in the art of FEC coding/decoding. To put it bluntly, reading beyond the first three words of claim 35 quickly and unmistakenably reveals that this claim should not be restricted from the other claims in this application.

The Applicants also dispute the conclusory and unsupported assertion in the Second Office Action that "[t]his new claim is drawn to a separate class and subclass."

The Applicant wonders, "Which separate classes and subclasses" does the Office mean? The Office must either substantiate this assertion with evidence and reasoning (such as identifying the allegedly different class/subclasses) or withdraw the restriction.

Moreover, a proper restriction requires a showing that it would be an undue burden on the Office to examine the restricted claims together. The Second Office Action did not even attempt to assert such a showing. There is certainly no extra burden on the Office to examine claims 35-38 in this application. Indeed, claim 35 is clearly allowable over the prior art of record in light of the foregoing discussion in these remarks.

Conclusion

In view of the foregoing amendments and remarks, the present application is now believed to be in condition for allowance. The Examiner is encouraged to telephone the undersigned if any issues remain.

Respectfully submitted,

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